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DECLARATION

I, Suzanne F. Gagliardi, declare that I am certified by the American Translators Association as a translator of German into English and that I have carefully made the attached English language translation from the original document:

German Patent Application no. 100 53 331.0 filed on October 27, 2000 at the German Patent Office, entitled

Verfahren und Informationssystem zur Überprüfung
von elektronischen Lieferschein- und Transportdaten

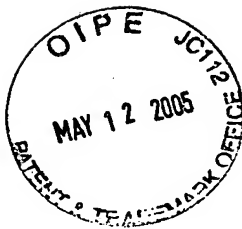
[METHOD AND INFORMATION SYSTEM FOR VERIFYING
ELECTRONIC SHIPPING-VOUCHER AND SHIPPING DATA]

written in German; and that the attached translation is an accurate English version of such original to the best of my knowledge and belief.

Date: April 19th, 2005

Signature:

Suzanne F. Gagliardi



[10537/172]
Translation SFG x6309

METHOD AND INFORMATION SYSTEM FOR VERIFYING
ELECTRONIC SHIPPING-VOUCHER AND SHIPPING DATA

The present invention is directed to a method for verifying electronic shipping-voucher [**delivery-note**] and shipping data, sent by a sender [**forwarder or consignor**] to an information system, as well as to an information system suited for this purpose.

Most system providers, who manufacture complex products [**commodities**], have at their disposal a wide network of external vendor firms, who supply the system providers with various resources in the form of raw materials, semifinished products, components, and services. These resources are ordered by the system provider - depending on the requirements that arise - from the suppliers, and are delivered by the suppliers at a point in time defined by the system provider, to a location specified by the system provider, in one of the manufacturing plants of the system provider. The delivery of a particular order amount, i.e., the shipping of the goods to which the order pertains, is accompanied by a shipping voucher, i.e., by corresponding shipping information sent by the supplier to the system provider. This shipping voucher, i.e., the corresponding shipping information is sent within the system provider firm to the plant or location where the goods are to be delivered. In order for the goods to be received [**for the consignment to be accepted**] at the proper location, the data contained in the shipping vouchers or in the shipping information must be error-free. The shipping vouchers or the shipping information are largely provided as electronic data records, whose format is defined by German or international standards (e.g., VDA 4913 for shipping voucher data, VDA 4921 for shipping data).

In one year, a typical system provider collects several hundred thousand shipping vouchers and consignment notes [waybills], which all need to be recorded, checked and processed by the plant to which the goods are to be delivered.

5 If the shipping voucher or shipping data are incorrect, then they must be corrected manually. This involves replacing incorrect information or obtaining and adding missing information, thereby necessitating substantial interactive effort. If the received data are irreparable [beyond
10 correction], then a receive report is drawn up, and the data are stored as unusable [data]. The consequence is that, in the case of a delivery, important information pertaining to this delivery is missing, which may lead to considerable extra expenses, and time delays (e.g., due to misallocation of the
15 delivered goods).

The underlying object of the present invention is, therefore, to devise a method and an information system which will make it possible to substantially reduce the outlay [extra work]
20 entailed in checking and correcting electronic shipping voucher and shipping data.

This objective is achieved in accordance with the present invention by the features of Claims 1 and 5.

25 Accordingly, the electronic shipping-voucher and shipping-data records sent by a supplier and received by the system provider are first checked by an information system for the presence or absence of errors. If a data record is classified as being
30 error-free, it is then routed to a company [in-house] receiver (e.g., to the section of the plant where the goods were intended to be delivered). If, on the other hand, the data record is faulty, it is then stored in a defined access area of the information system, where it may be examined by the
35 sender (i.e., by the supplier in question) and revised. The supplier may examine the defined access area to obtain a

check-back indication, on-line, as to whether the data sent by him is classified as incorrect; in addition, he has the possibility of revising this incorrect data himself.

5 At the core of the present invention is the crucial realization that, as a general rule, it is substantially more difficult and expensive for the system provider to correct a faulty shipping-voucher or shipping-data record than it is for the supplier, who created and sent this faulty data record.

10 Thus, the faulty data records may be corrected much more quickly and effectively, in so far as these data records are able to be reflected back [**relayed**], on-line, to the supplier, and the supplier's corrections are able to be inserted into the data record on-line. Thus, the system provider may realize
15 substantial savings (because the need is eliminated for manually correcting the data records, as is the corresponding outlay for obtaining information); on the other hand, the supplier receives comprehensive information about the legibility of the shipping voucher and shipping information
20 sent by him, from the system provider. This knowledge may be used by the supplier to analyze his internal procedures with respect to sources of error in creating the shipping-voucher and shipping-data records and, thus, to selectively reduce the error rate.

25 The automatic review that a data record sent by the supplier undergoes in the system provider's information system includes, first of all, once again, a verification that the sender is, in fact, authorized to send; furthermore, it is
30 checked whether the syntax of the transmitted data record conforms with the agreed-upon standard (e.g., VDA format). It is particularly advantageous when the data record may be further checked for conformity with a purchase order, sent by a system provider, who had initiated this delivery, to the
35 supplier in question (see Claim 2). This requires that the information system be provided with an interface to a database of the system provider, in which the order information is

electronically stored (see Claim 6). The order information checked using the information system expediently includes the article number and quantity of the goods to be delivered, the delivery location, etc., in short, all information which ensures a frictionless receipt of the goods to be delivered at the receiving location of the system provider.

The incoming shipping voucher and shipping data may be checked for errors within the system provider's plant environment at a plant or area-of-operations level; this means that each plant or each area of operations runs its own information system, with whose assistance, the shipping voucher and shipping data relevant to this plant or this area of operations are checked, and the faulty data being collecting in this information system are reflected back [relayed] to the supplier. Much more beneficial is, however, performing this verification on a firm-spanning central information system of the system provider, on which all shipping-voucher and shipping data concerning the system provider are checked and displayed - independently of the plant or area of operations that they [the data] pertain to (see Claim 3). This has the advantage, on the one hand, of enabling the supplier to inspect all faulty data records sent by him to various plants or areas of operation of the system provider, at one single location - namely the defined access area of the central information system -, instead of having to search for these data in a combination of various information systems. On the other hand, it has the advantage of enabling the system provider to evaluate all faulty data records relevant to one specific supplier, at one central location (see Claim 4). From this, profiles of the quality of the data sent by the supplier may be generated and used, in cooperation with the supplier, as a basis for developing measures for improving the quality of the data.

The supplier's access to the defined access area of the information system that concerns him expediently takes place

over the Internet (see Claim 7): The supplier may log onto the system provider's information system via a password or a user portal to obtain access (read and write rights) for that defined access area in which the faulty data sent by him are stored.

In addition, it is advantageous to allow the system provider's plants or areas of operation, which are receiving the goods, to inspect the faulty data contained in the defined access areas of the central information system (see Claim 8). It can happen, namely, that goods are delivered before the corresponding electronic shipping voucher or shipping data stored in the access area are able to be corrected by the supplier; should such a necessity arise, the plant or area of operations receiving the delivery may examine the defined access area corresponding to this supplier, download the faulty electronic shipping voucher or shipping data relevant to this delivery, manually correct it, and assign it to the delivery that has arrived.

The present invention is elucidated in the following, in light of an exemplary embodiment illustrated in the drawing, whose figures show:

Figure 1 a schematic representation of an information network between a system provider and suppliers;

Figure 2 a schematic flow chart describing verification of a shipping voucher or shipping data record;

Figure 3 screen displays of an operator interface, which may be examined by the supplier, of an information system for shipping voucher and shipping data:

Figure 3a overview of the transmitted data;

Figure 3b mask for revising faulty data;

Figure 3c illustration of the performance

[characteristics].

Figure 1 schematically depicts an information network 1 between a system provider 2 and a plurality of suppliers 3,3'. It is used to prepare and further process shipping-voucher and shipping data. Suppliers 3,3' send shipping-voucher and shipping data in electronic form (indicated by arrows 4 in Figure 1) to system provider 2. For this reason, suppliers 3,3' are also referred to in the following as "senders" 4. Both the electronic shipping vouchers, as well as the electronic shipping information are provided in a standardized format (e.g., VDA 4913 or VDA 4921).

The incoming data are routed to a central information system 6 of system provider 2 and, there, checked by a test program; this is shown in the schematic flow chart of Figure 2. In a first step 7, it is checked whether the sender of this data record (i.e., supplier 3,3' in question) is authorized to send; if this is not the case, the relevant data record is provided with an error code. In a further step 8, the syntax of the transmitted data record is checked to verify conformity with the agreed upon standard (e.g., VDA format). If the data record does not meet these requirements, it is classified as faulty, and provided with an error code characterizing this error. If the data record does conform with the VDA standard, then the information content of the data record may be interpreted, and the information contained therein is checked in a further review step 9 for its consistency with an order. To this end, central information system 6 accesses a database 10 having master data in which are centrally stored the orders executed by system provider 2. This database 10 is searched to find an order which matches the information contained in the electronic shipping voucher with respect to the order number, the type and quantity of goods to be delivered, and the delivery location, etc. of the delivery. If no such order is found, then the shipping voucher in question is classified as faulty and is provided with an appropriate error code. If desired, the received shipping voucher or shipping data may be subjected to further checks to determine whether the data

record in question is classified as faulty or error-free. The specific error codes are stored in a database 11 which central information system 6 has access to.

5 If the shipping voucher or shipping data record is classified as being faulty [**erroneous**] in all review steps 7,8,9, the data record is then sent to a receiver 12 in that plant 13 and/or that area of operations which, upon arrival, accepts the goods or allocates them to an account (this is indicated
10 in Figure 2 by arrows 14). It is, thus, ensured that, in this plant 13 or area of operations, an error-free data record is at hand, which clearly describes the expected delivery and which may be assigned to this delivery by the processors [**originators**] in this plant 13 or area of operations when the
15 goods are received. Since the data record is free of errors, no further (manual or interactive) processing of the data record is necessary in plants 13 or in the areas of operation.

If the shipping-voucher or shipping-data record is classified
20 as being faulty in some test [**validation**] station 7,8,9, then the data record is stored in a defined access area 15 of central information system 6. All faulty data records relevant to a specific supplier 3' are stored, in the process, in a defined access area 15' assigned to this supplier 3'. Supplier
25 3' is granted access rights to the defined access area 15', in central information system 6, so that he may inspect and revise the data stored in this area 15'. This access is expediently carried out over the Internet: For this, a supplier 3,3' logs onto a home page configured for this
30 purpose, for example, or onto an Internet portal of system provider 2, from where he arrives - by entering a password - at defined access area 15,15', appropriate for him; this is indicated in Figure 1 by arrows, 16,16'. Supplier 3,3' is able to view a display of the data records which are stored there
35 and identified as faulty (and possibly provided with an error code designating the type of error); supplier 3,3' may modify

or correct each of these data records. Once a revision is made to a data record, this data record is again subjected to the verification sequence of Figure 2; if, at this point, it is classified as error-free, then - as described above - it is relayed to an appropriate plant 13 or area of operations; if it is still faulty, it is then stored, in turn, in defined access area 15,15' assigned to this supplier 3,3', so that a renewed correction may be made by supplier 3,3'.

Figures 3a through 3c illustrate an example of an implementation of an operator interface 17a,17b,17c, which enables a supplier 3' ("test vendor"), who used a password to arrive at this operator interface 17a,17b,17c, to examine and revise the information of his defined access area 15'. The representation of Figure 3a shows a schedule of those data records 18,18',18", which supplier 3' ("test vendor"), named in data field 19, had sent to system provider 2 in the time period displayed in data field 20 and which are designated for plant 13 ("Berlin") indicated in data field 21. These are three data records 18,18',18", of which two (18',18") were classified as error-free (i.e., status "OK" in data field 22), while a data record 18 was classified as faulty (i.e., status "ERROR" in data field 22). For each data record, an internal reference number is given in a data field 23, and the send and receive information is given in data field 24.

Each data record 18,18',18" may be individually selected by supplier 3' ("test vendor"); in this manner, supplier 3' arrives at operator interface 17b (Figure 3b), in which detailed information is displayed with respect to selected data record 18. In the example at hand, it is indicated in data field 25 that selected data record 18 contains a syntax error; the corresponding error code is indicated in data field 26. By selecting control button 27 ("correct data"), the supplier arrives in a mode where he may implement changes to the displayed data record 18. Once these revisions are made, he may once again forward modified data record 18 by selecting

control button 28 ("send data") to central information system 6, where - as described above - data record 18 is once again checked.

5 To evaluate the performance of a supplier 3' with respect to the error rate of the data sent by him, the number of faulty data records 18 of this supplier 3' are calculated in relation to the total number of data records sent by this supplier. In addition, the error rate may be analyzed in the various error
10 categories (syntax errors with respect to VDA standard, errors of content, etc.). Periodically updating these error rates enables one to visualize "improvements" or "deteriorations" in the supplier's performance. An example of such a screen display 17c is shown in Figure 3c.

15 If the faulty [erroneous] shipping-voucher or shipping-data records 18 stored in defined access areas 15,15' are not corrected quickly enough by suppliers 3,3', then it can happen that the delivery associated with this data record arrives in
20 the receiving plant 13 or area of operations, before a corrected data record can be sent by the central information system 6 to the involved plant 13 or area of operations. In such a case, in order to have rapid access to a data record describing this delivery - even if it be faulty -, plants 13
25 or the area of operation expediently have access rights to defined access area 15,15' of the suppliers (indicated in Figure 1 by the dotted-line arrows 29). In this manner, when such a necessity arises, the faulty shipping-voucher or shipping data records may be inspected in access area 15,15'
30 of plants 13 or areas of operation, and the (faulty) data record which corresponds to the current delivery may be searched [picked] out manually.

35 In the interest of having an effective interaction with the suppliers and a company-wide, clear and concise display of the faulty data records, for one system provider 2 - as shown in Figure 1 - it is practical to provide only one single central

information system 6, in which faulty data records 18
accumulated over all plants 13, may be checked, managed, and
viewed. Alternatively, however, one may also move the central
information system to the plant level, thereby giving each
5 plant 13 or area of operations its own central information
system.

The method of the present invention and the system of the
present invention are especially suited - as described - for
10 exchanging shipping-voucher and shipping data between
suppliers and a system provider. In another context, however,
the method and the information system are also suited for use
in any processes where a plurality of partners interact by
exchanging electronic information, the possibility existing
15 that the exchanged data are faulty.

What is claimed is:

1. A method for verifying electronic data records containing electronic shipping-voucher and/or shipping data, which are sent by a sender [**forwarder or consignor**] to an information system, characterized by the following method steps:
 - the information system (6) receives the electronic data record;
 - the data record is checked by the information system (6) for the presence of errors;
 - if the data record (18,18") is error-free, it is then routed to a receiver (13);
 - if the data record (18) is faulty, it is then stored in a defined access area (15) of the information system (6), where it may be examined by the sender (5,3) and revised.
2. The method as recited in Claim 1, wherein when verifying the data record, ordering information stored in a database (10) is used to adjust the information of the data record.
2. The method as recited in Claim 1, wherein the verification of the data is performed for a plurality of plants (13) and/or areas of plant operation of a system provider (2), jointly at one central location.
3. The method as recited in Claim 1, wherein the number and type of errors of faulty data records (18) contained in the defined access area (15) are analyzed with respect to their development over time, and this information is displayed in the defined access area (15).

5. An information system for verifying electronic data records containing electronic shipping-voucher and/or shipping data, which are sent by a sender [**forwarder or consignor**] (3,5) to the information system (6), comprising
 - an interface for receiving a transmitted electronic data record;
 - a processing unit for recognizing a faulty data record (18);
 - a defined access area (15) for storing the faulty data record (18), the data records (18,18',18") contained in this access area being able to be inspected and revised by the sender (3,5); and
 - an interface for routing a faulty data record (18) to a receiver (13).
6. The information system as recited in Claim 5, wherein the information system (6) includes an interface to a database (10) containing order information.
7. The information system as recited in Claim 5, wherein the data records (18,18',18") contained in the defined access area (15) are able to be inspected and revised by the sender (3,5) over the Internet.
8. The information system as recited in Claim 5, wherein the faulty data records (18) stored in the defined access area (15) of the information system (6) are able to be inspected by the receiver (13).

Abstract

The present invention is directed to a method and an information system for verifying electronic shipping-voucher and shipping data sent by a sender (in particular a supplier) to a receiver (in particular a system provider or a plant). Faulty data records are automatically detected [**recognized**] and displayed in a defined access area of a central information system. The sender is able to inspect this defined access area, which contains the faulty data records sent by him, and modify the data records it contains. In this manner, the sender receives, on-line, a check-back indication [**acknowledgment**] of the quality of the data records sent by him, and, if indicated, is able to make a correction. The sender's access to his defined access area expediently takes place over the Internet.

Translation Key to Figures

Figure 1

6 central information system
11 error codes
10 master data

Figure 2

11 error codes
10 ordering information

Flow chart:

data record

sender authorized? no

yes

compatible with VDA data? no storing of the data record
in the defined access area

yes

compatible with ordering no
information?

yes

plant

Translation key to Figure 3a (screen shot)

	EDIweb	Search	What's new	Content	Interactive	Help	English
Supply Portal Supply Current General Supply information Applications: LS determination according to VDA LS-DFU quality Shipment overview Shipment information Error correction Quality report LS-DFU monitor		Data sender / Vendor					
		Test vendor					
		Data receiver / Plant					
		Plant Berlin					
		Selection time period					
		4/5/2000 to 4/20/2000 5:00 am - 8:00 pm					
			Shipment - Lading		Shipment		
	Shipment status		Reference number		Date	Time	Receive
	ERROR		57112		4/20/2000	7:15	4/20/2000 8:05
	OK		57108		4/17/2000	6:45	4/17/2000 7:34
	OK		57101		4/5/2000	7:08	4/5/2000 7:56

Translation key to Figure 3b (screen shot)

	EDIweb	Search	What's new	Content	Interactive	Help	English
Supply Portal Supply Current General Supply information Applications: LS determination according to VDA LS-DFU quality Shipment overview Shipment information Error correction Quality report LS-DFU monitor	Data sender / Vendor						
	Test vendor						
	Data receiver / plant						
	Plant Berlin						
		Shipment - Lading		Shipment		Receive	
	Shipment status	Reference number		Date	Time	Date	Time
	ERROR	57112		4/20/2000	7:15	4/20/2000	8:05
	Error code	Sum of Errors		File/ Field	Description		
	I11110	1		Data sender no.	Field content is not numerical		
	4913 content						
Rows of number (see original)							
Correct data							
Send data							

Translation key to Figure 3c (screen shot)

	EDIweb	Search	What's new	Content	Interactive	Help	English
Supply Portal supply Current General Supply information Applications: LS determination according to VDA LS-DFU quality Shipment overview Shipment information Error correction Quality report LS-DFU monitor				Data quality of shipping voucher data according to VDA 4913 Quality report of August 9, 2000			
				Data sender / Vendor			
				Test vendor			
				Data receiver / Plant		Month of report	
				Plant Berlin		July 2000	
				Assessment:			
				<u>Data quality</u>		<u>Shipment capacity</u>	
		Previous month	Month of report	Tendency	Previous month	Month of Report	Tendency
		Transmitted data records			Total positions		
		32,547	38,119		54,921	62,430	
		Total errors			Positions per DFU		
		23,579	54.448		43,911	30,712	
		Error quota			Shipment capacity		
		72.4 %	142.8 %		80.0 %	49.2 %	